

Thoughts on Embracing Biological Diversity as a Source of Design Knowledge

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Images of J.B.S. Haldane and beetles
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“Inordinate Fondness of Beetles”

Images of J.B.S. Haldane and beetles
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Customized Technology

Images of Space Shuttle and biomedical ultrasound
(deleted to honor third-party copyrights)



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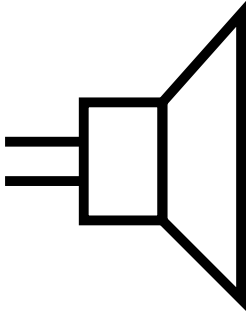


1.) Common Principle



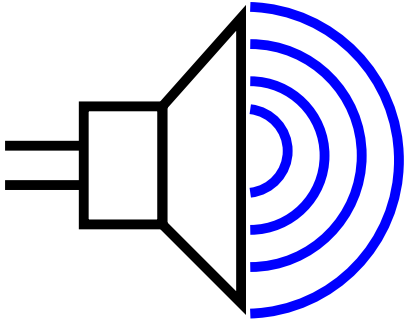
Principle of (Bio)sonar

emitter
(loudspeaker)



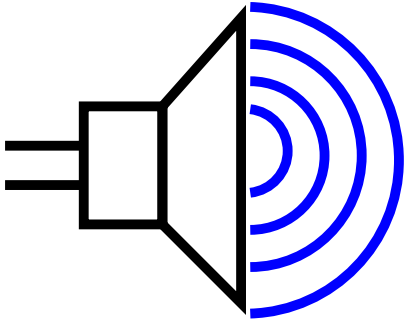
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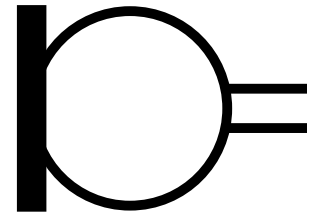


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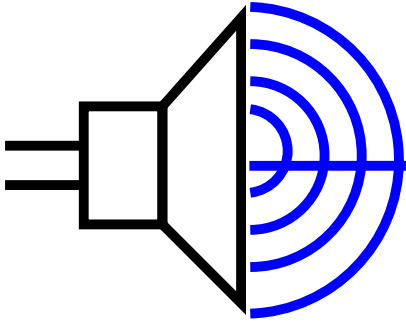


receiver
(microphone)

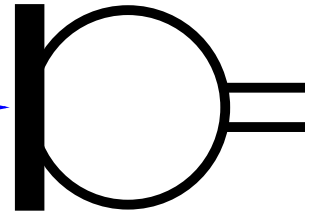


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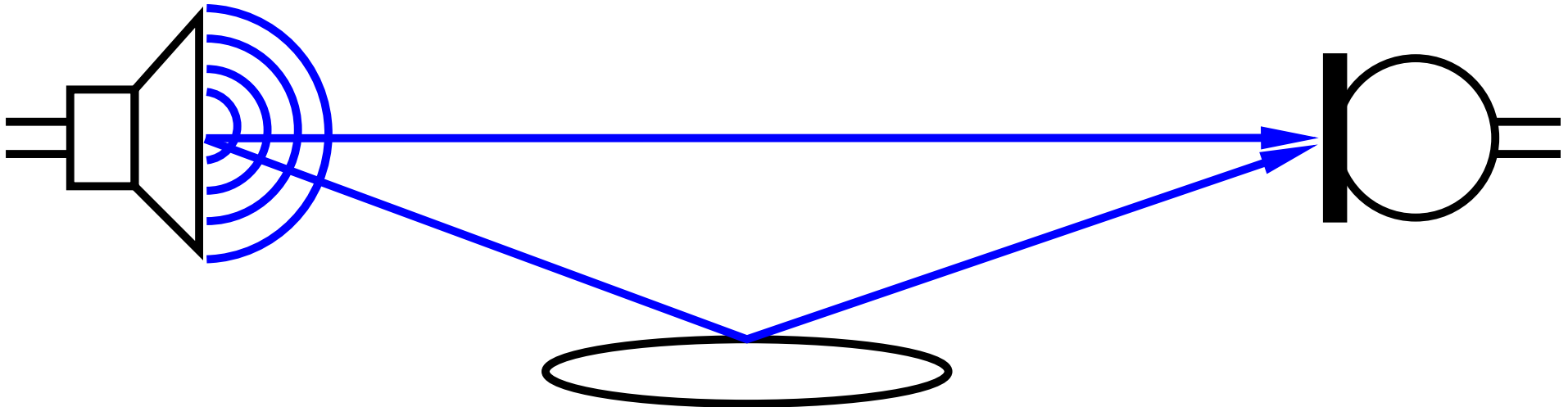
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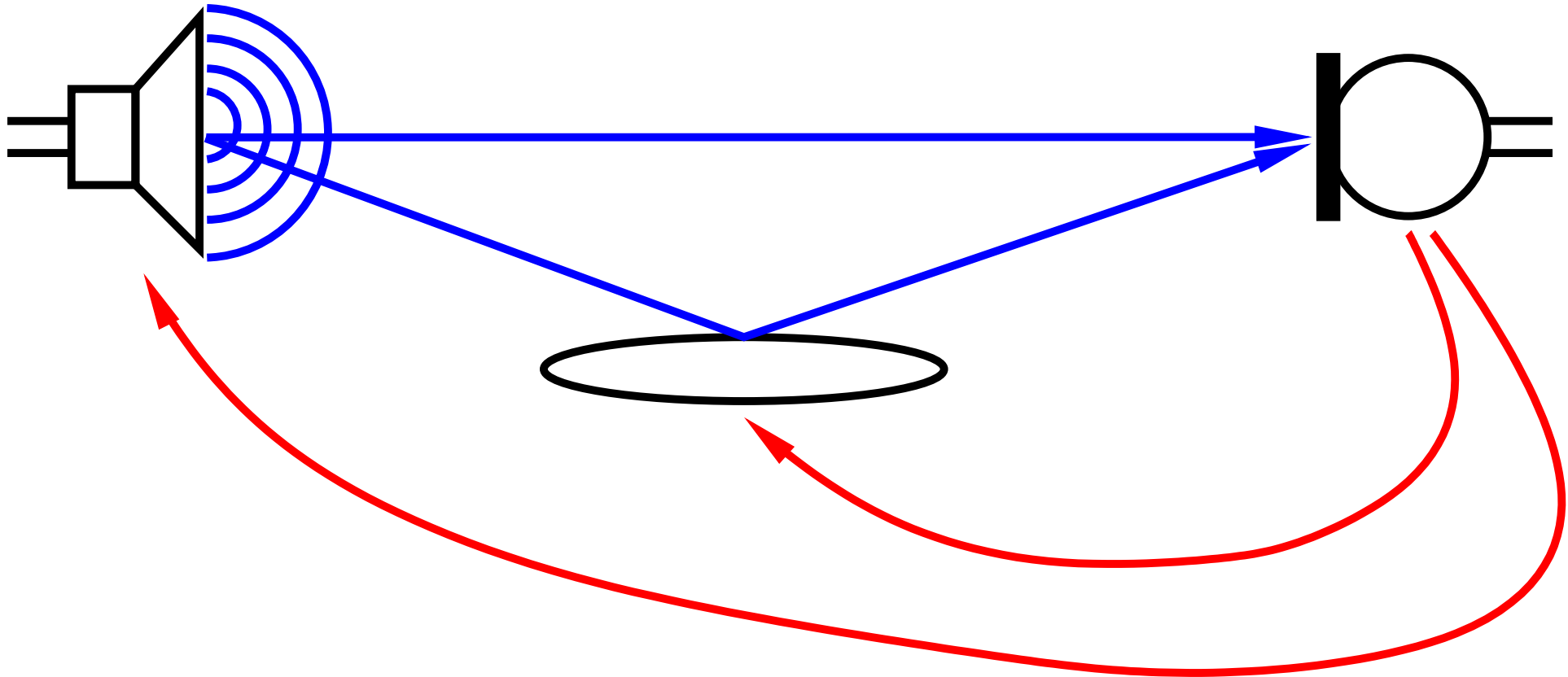
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2.) Adaptations of a Common Principle



Adaptations of a Common Principle: Biosonar

Images of bats hunting for food
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Adaptations of a Common Principle: Biosonar

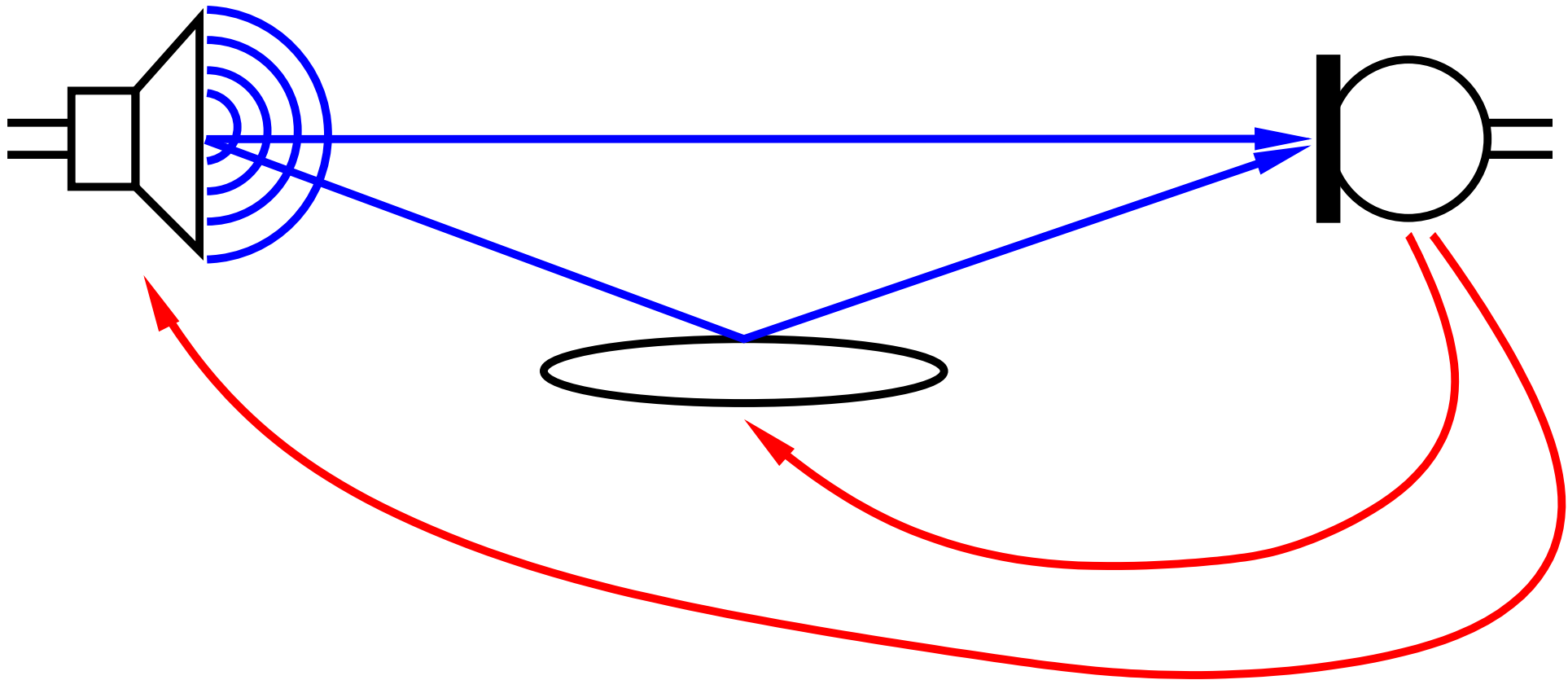
Images of bats hunting for food
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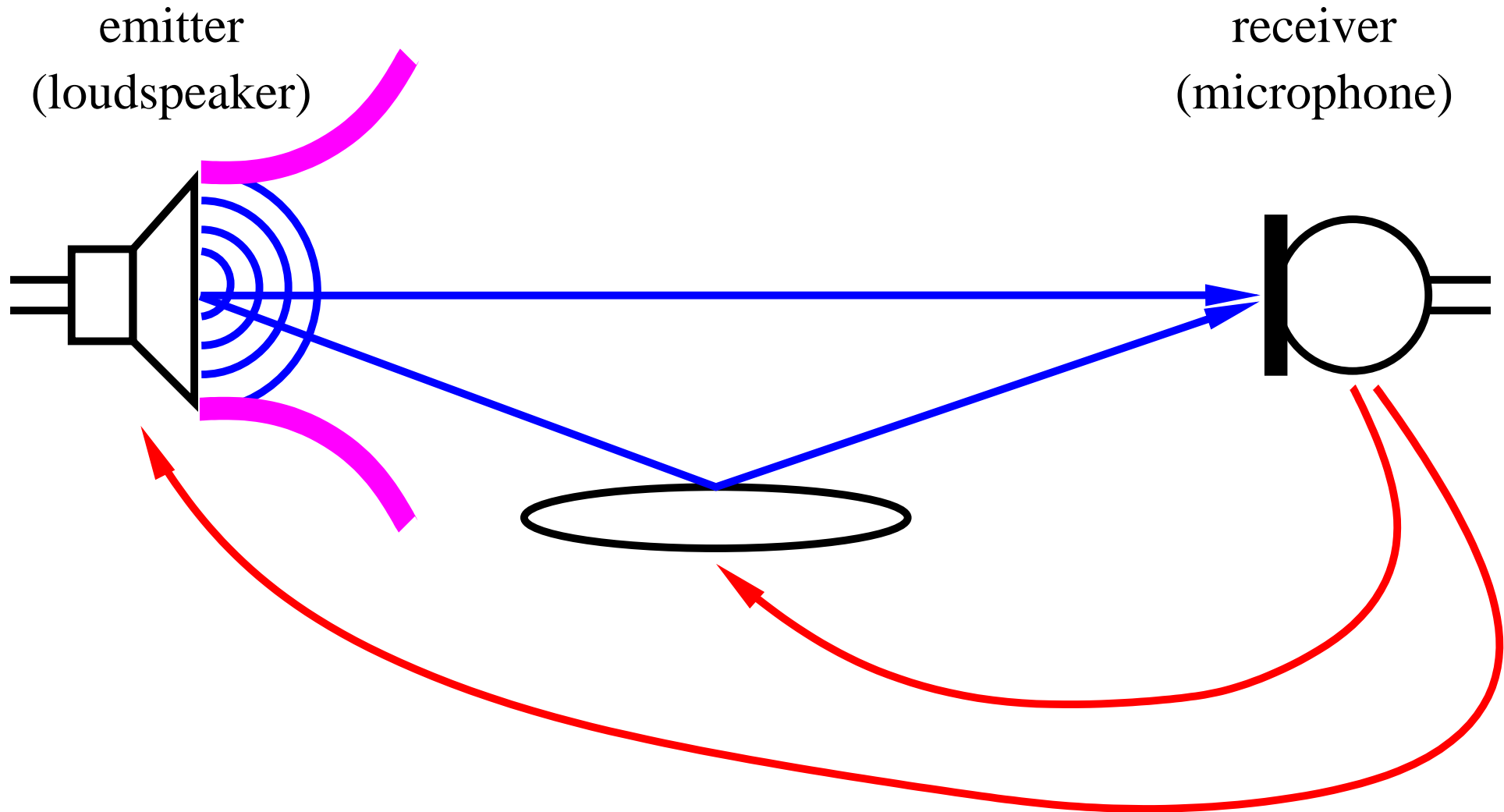
Principle of Biosonar Beamforming

emitter
(loudspeaker)

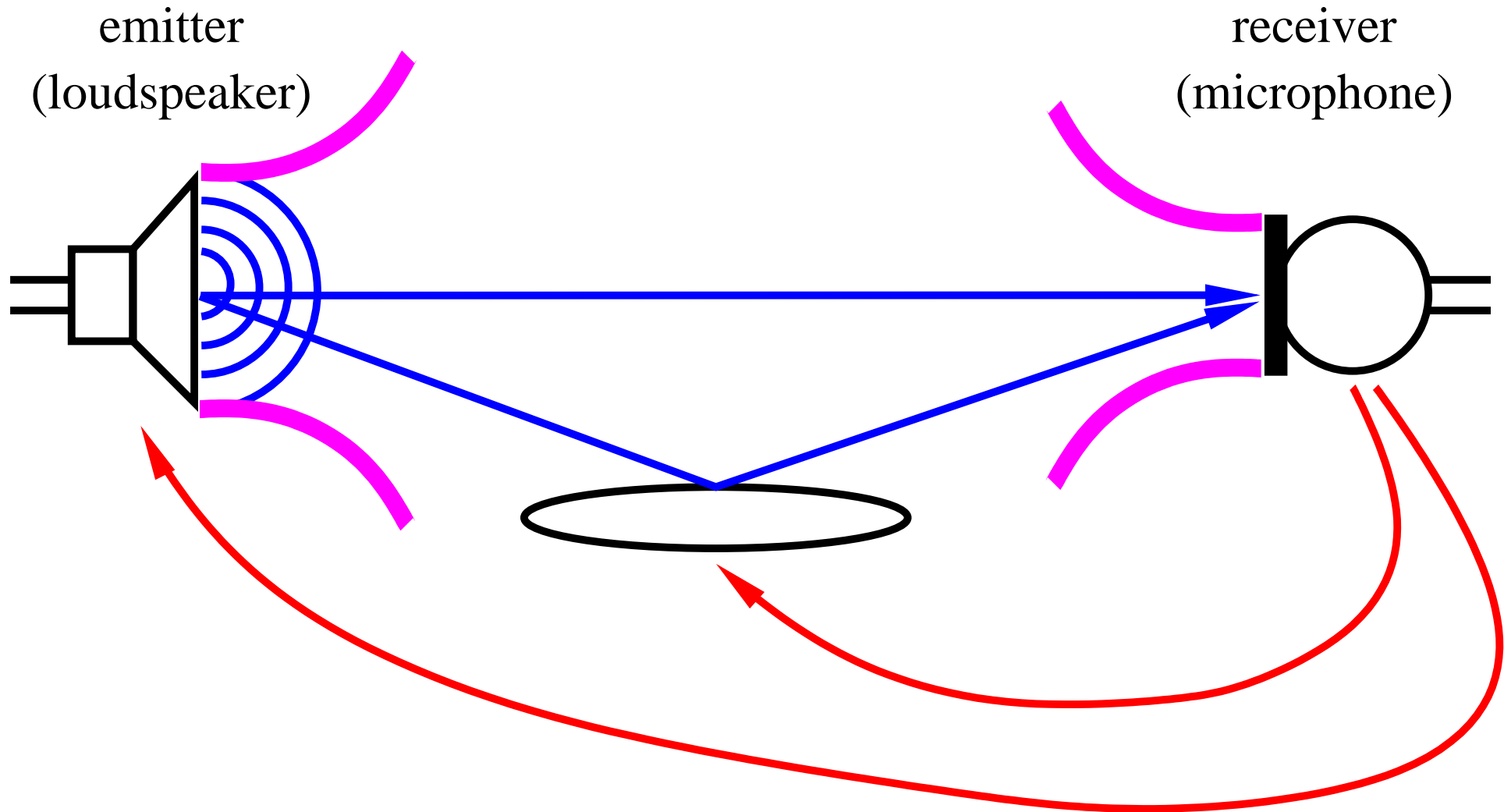
receiver
(microphone)



Principle of Biosonar Beamforming



Principle of Biosonar Beamforming



Adaptations: Beamforming Baffles

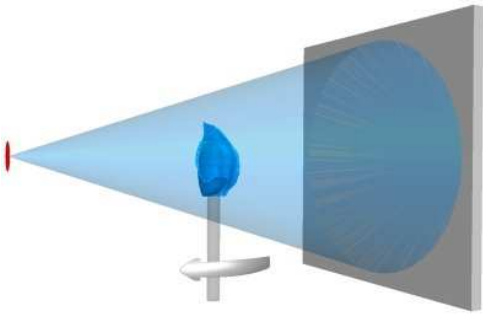
Bat portraits
(deleted to honor third-party copyrights)



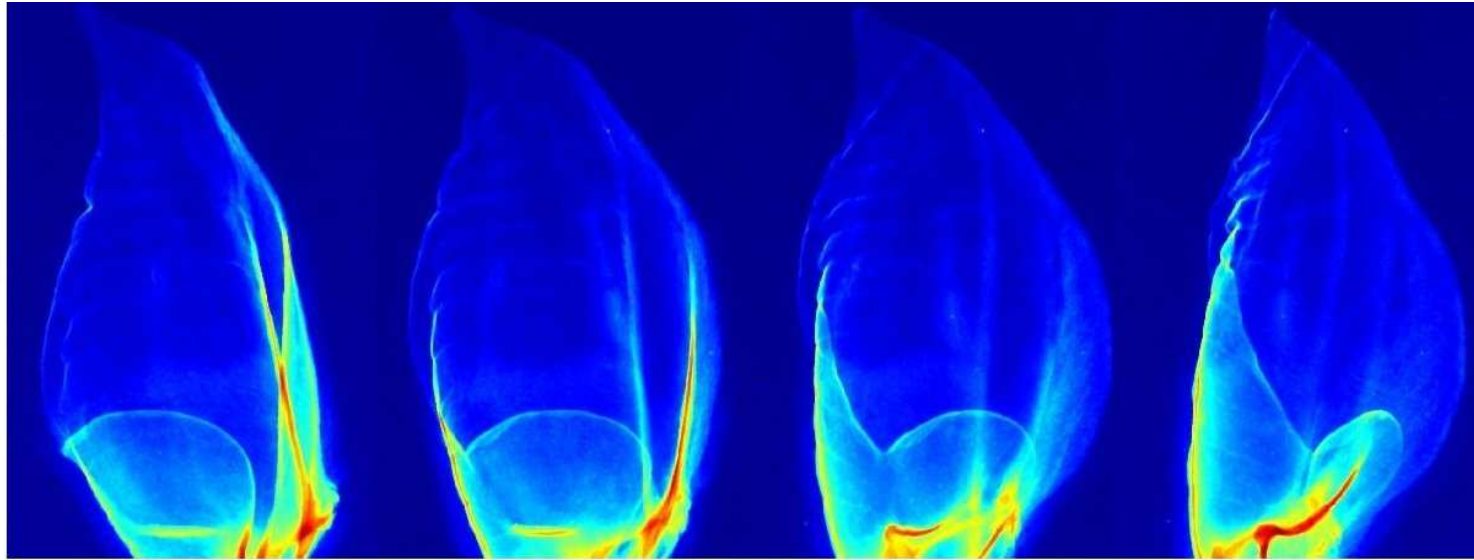
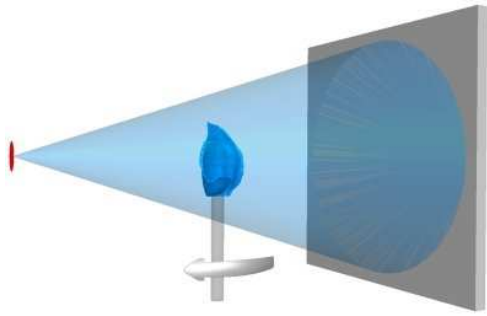
3.) (Automated) Quantitative Description



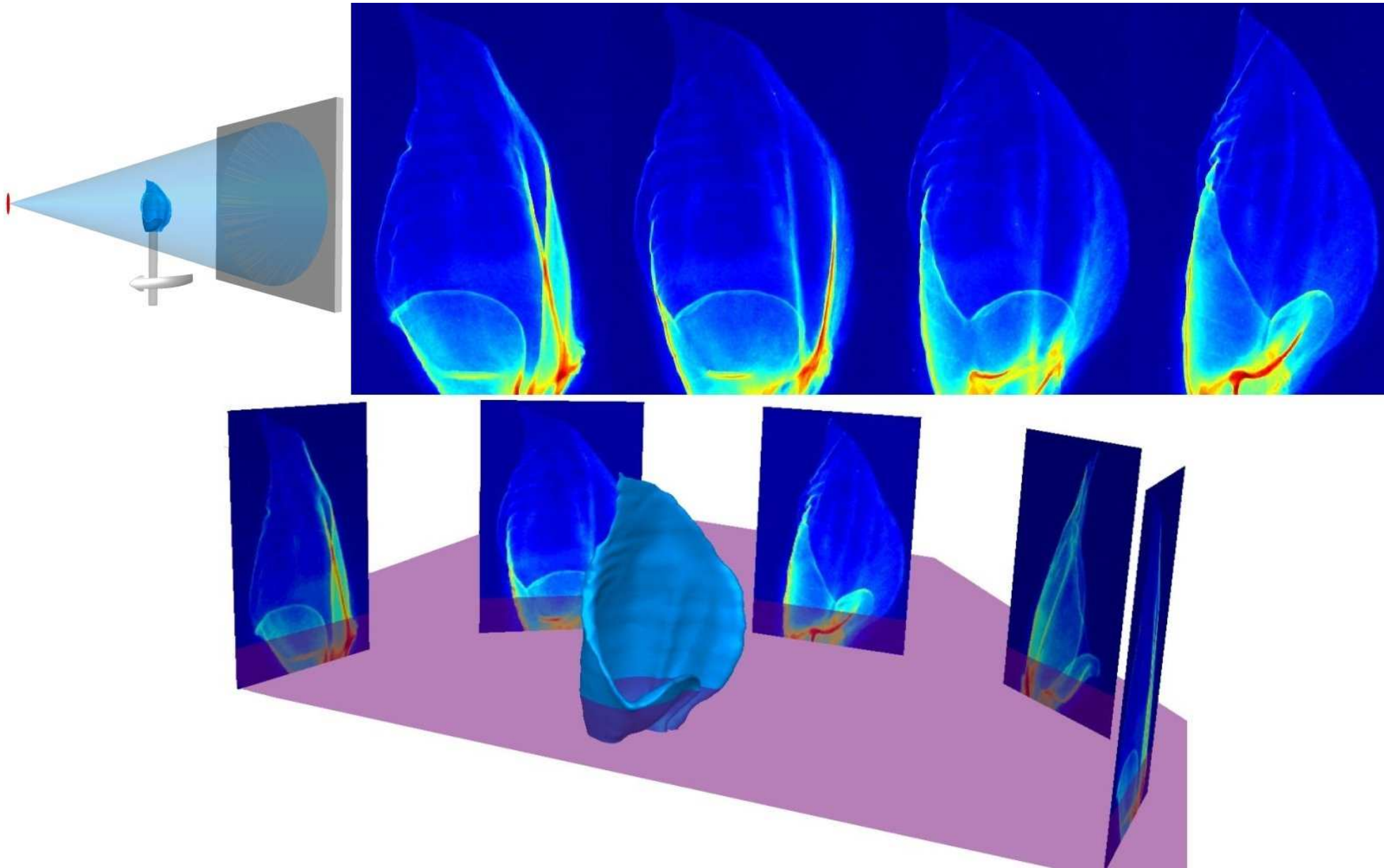
Digital Models of Biological Shapes



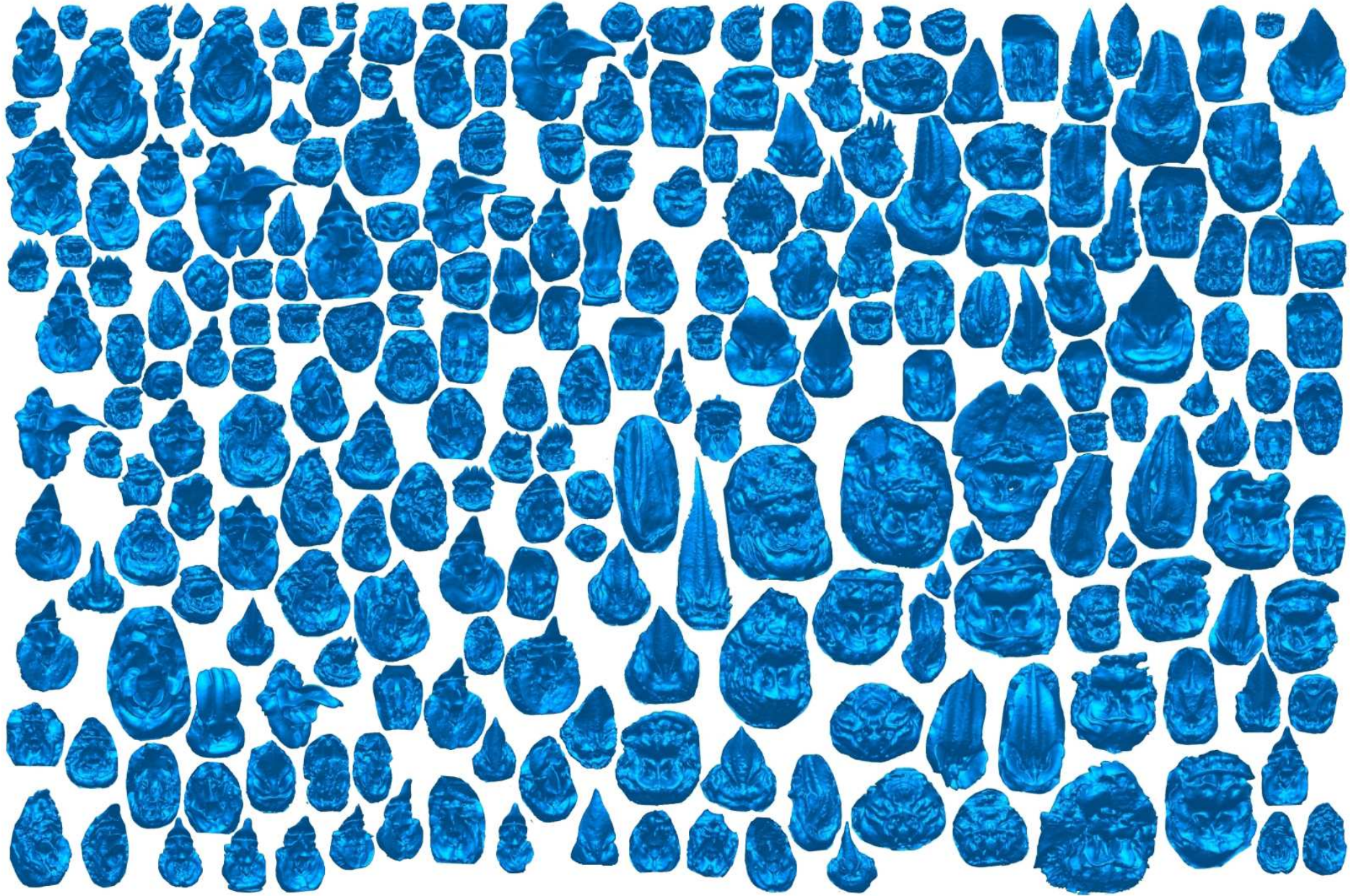
Digital Models of Biological Shapes



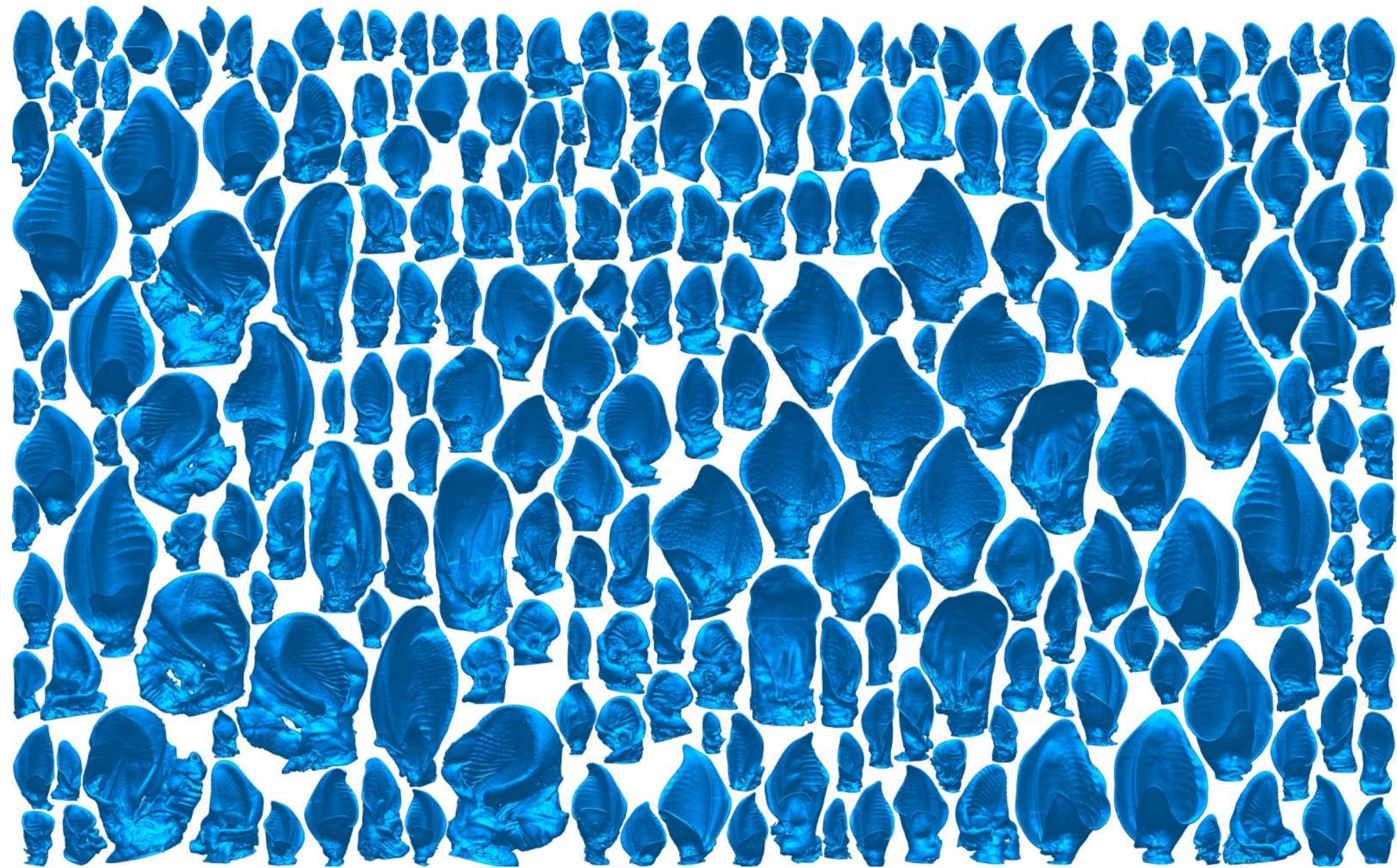
Digital Models of Biological Shapes



Diversity Database: Bat Noseleaves



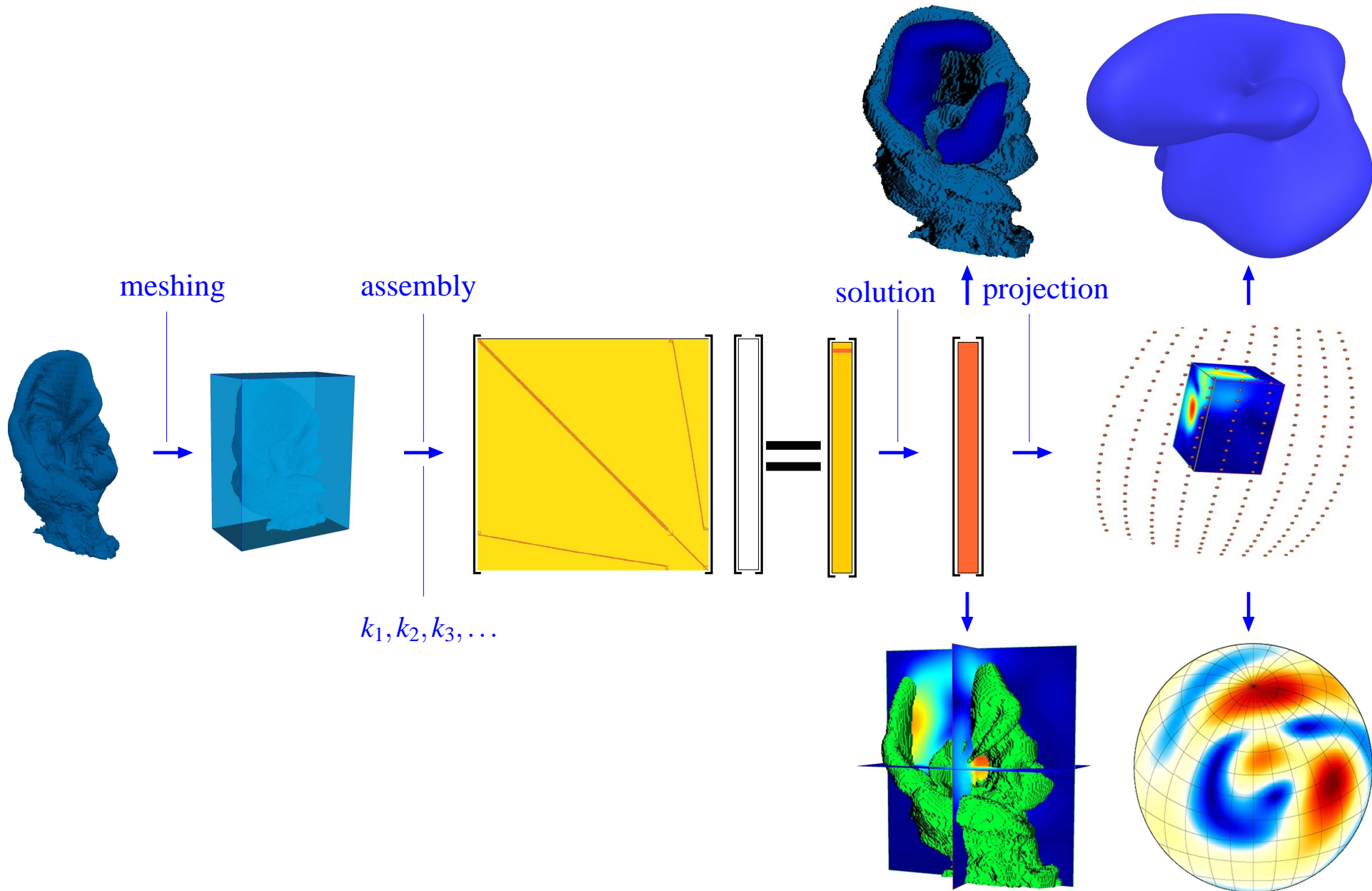
Diversity Database: Bat Pinna



4.) (Automated) Functional Characterization



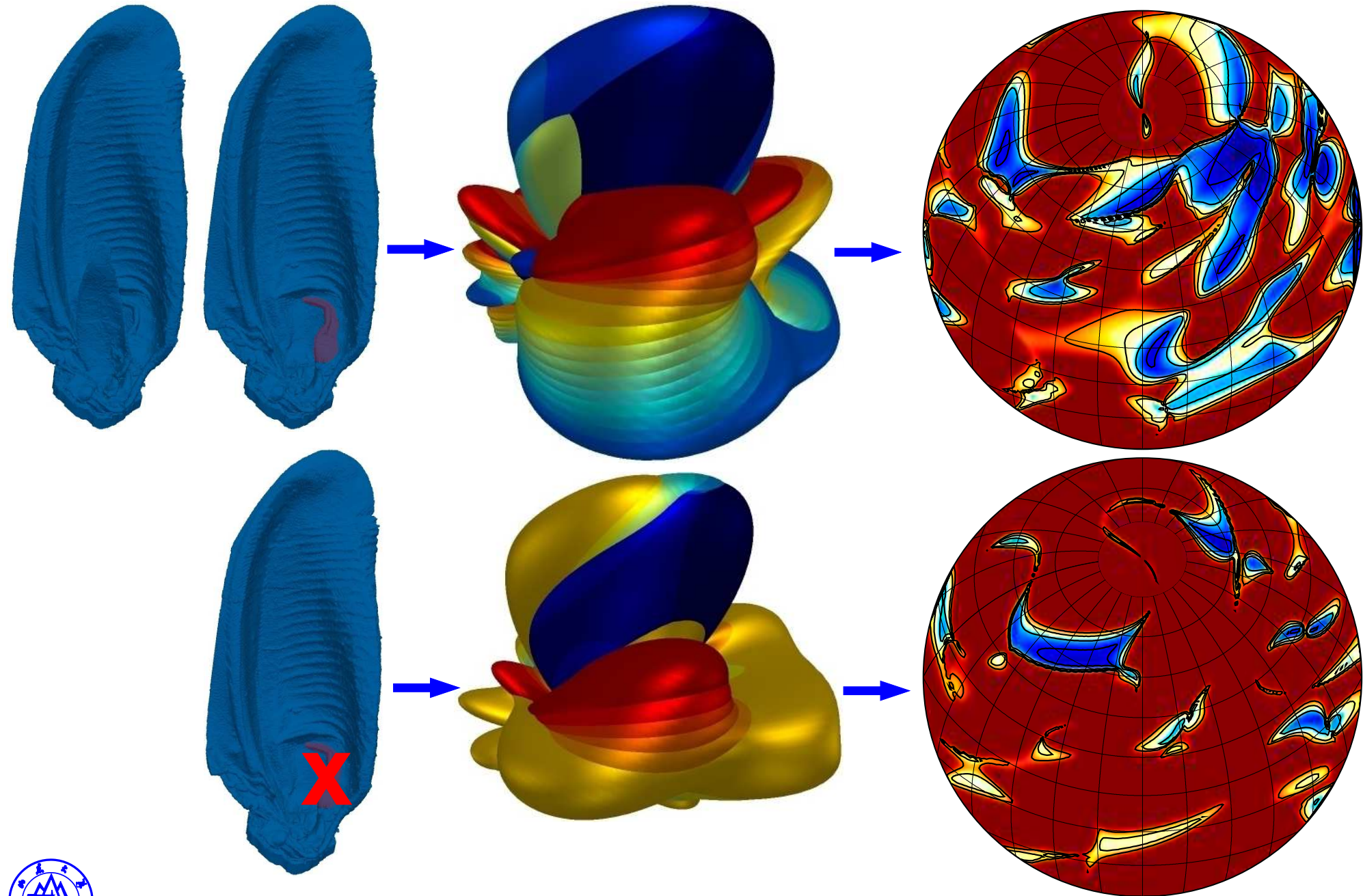
Numerical Prediction of Sound Fields



5.) Quantitative Evaluation of Form & Function



Shape & Direction Information



6.) Analysis of Variance



Suitable Representation

Images of faces.
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Suitable Representation

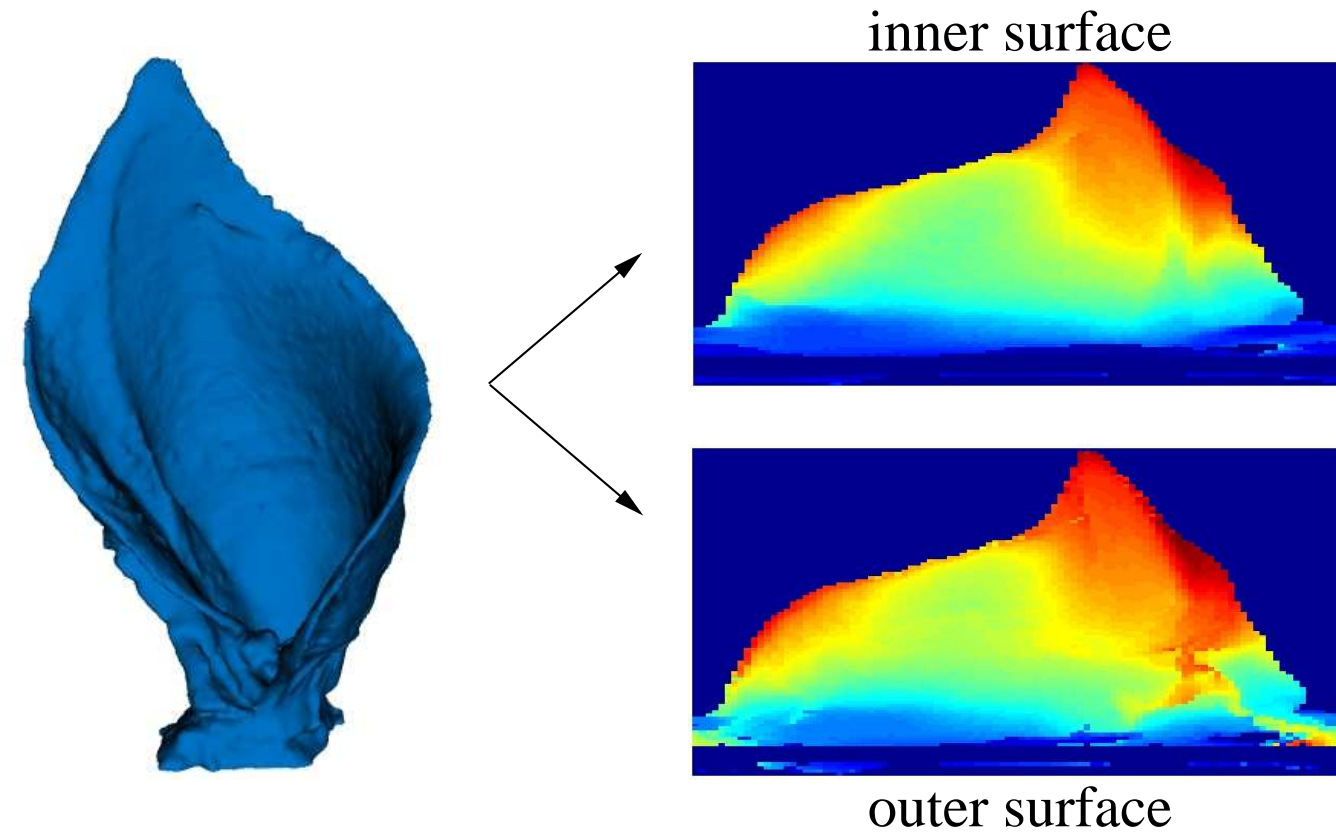
Images of faces.
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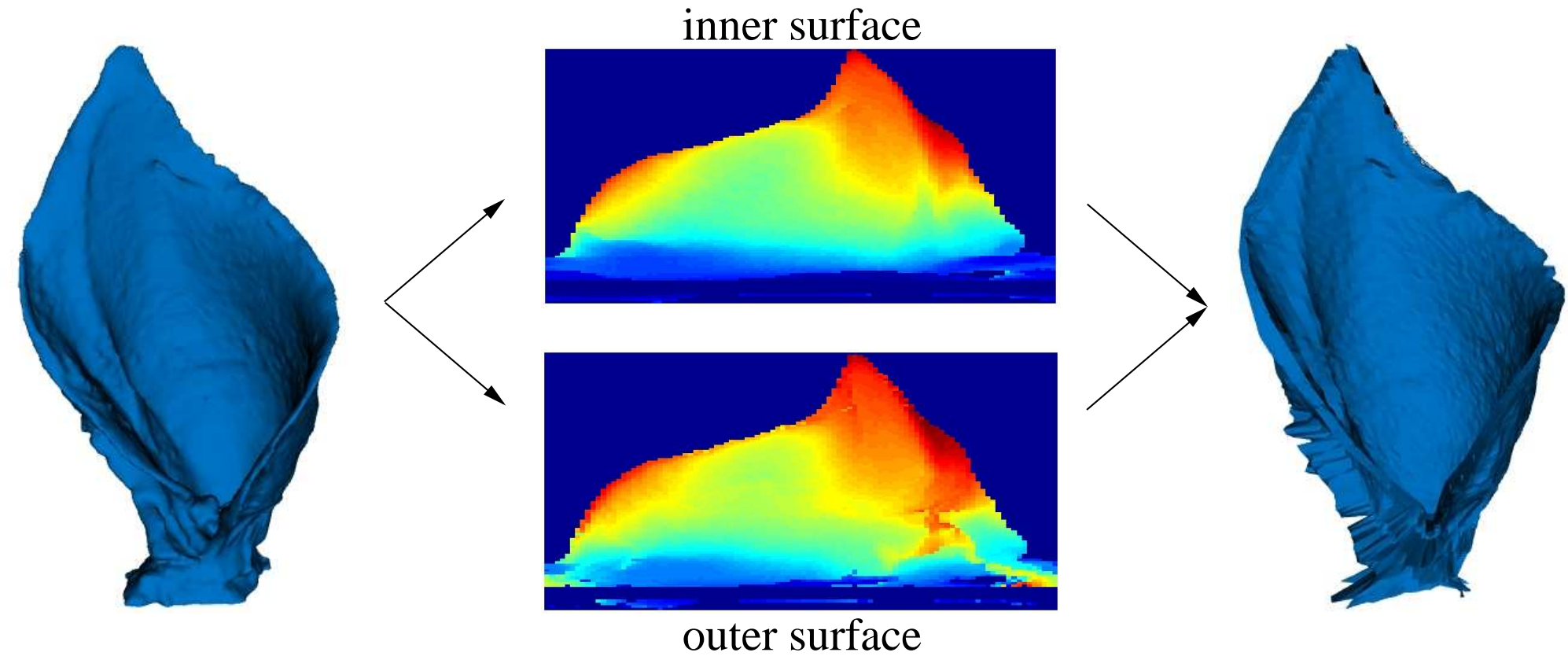
Transformation of Biological Shape



Transformation of Biological Shape



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